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List of Acronyms

AIDS	Acquired Immune Deficiency Syndrome
ANC	Antenatal Clinic
ANM	Auxiliary Nurse Midwife
BSS	Behavioural Surveillance Survey
CT	*Chlamydia trachomatis*
DALY	Disability Adjusted Life Year
GC	*Neisseria gonorrhoeae*
GDP	Gross Domestic Product
GNP	Gross National Product
HbsAg	Hepatitis B Surface Antigen
HIV	Human Immunodeficiency Virus
HPV	Human Papilloma Virus
HSV	Herpes Simplex Virus
IDU	Injection Drug User
IEC	Information, Education, and Communication
INP+	Indian Network of [HIV] Positive People
LHV	Lady Health Visitor
MPW	Multi Purpose Worker
MSM	Men having Sex with Men
NACO	National AIDS Control Organisation
NFHS	National Family Health Survey
NGO	Non-Governmental Organisation
OTC	Over The Counter
PHC	Primary Health Centre
PID	Pelvic Inflammatory Disease
RCH	Reproductive and Child Health
RH	Reproductive Health
RPR	Rapid Plasma Reagin
RTI	Reproductive Tract Infection
STD	Sexually Transmitted Disease
STI	Sexually Transmitted Infection
SW	Sex Worker
TPHA	Treponema Pallidum Haemagglutination Assay
TRIPS	Trade-Related Aspects of Intellectual Property Rights
UNAIDS	Joint United Nations Programme on HIV/AIDS
VDRL	Venereal Disease Regional Laboratory Test
WHO	World Health Organization
WTO	World Trade Organisation

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Abstract

Sexually transmitted infections (STIs), including HIV, currently have high salience on the health care agendas of many countries, including India. Strategies for their control are ideally based on a number of well-recognised principles. These include: assessments of the burden of disease; the availability of interventions at policy and programme levels, to influence behaviour change and technical 'solutions'; and the calculated cost-effectiveness of these interventions. In the case of India, data to inform these principles are often lacking in the case of STI control. In this paper we have reviewed the evidence base for STI control in the Indian context. The paper is split into a number of sections: a review of the socio-demographic and structural level factors which may indicate vulnerability to epidemics of the sexually transmitted infections; a compilation of the available evidence on the prevalence and epidemiology of these infections; individual level risk factors for infection; responses to risk and infection – both at the individual level and within the pluralistic health service; and a detailed review of the STI/HIV control programme in the country. We conclude with a summary of the evidence base and make suggestions for areas where further work is needed to strengthen this base.

Caveat

Information is, happily, in a state of fluidity. Since writing the original draft of this paper, new information and data have been published and shed new light on our understanding of the HIV/ STI epidemics in India. As far as possible we have tried to update the paper, but we recognise that there will always be gaps, and perhaps whole areas of importance that we have failed to address. We would be very grateful for any further relevant information that anyone reading this Working Paper is able to provide us with, and we will try to incorporate it into our next publication.

1. Introduction

India, like much of South and South-East Asia, is currently facing up to the prospect of a worsening HIV epidemic. Whilst much attention globally is focused on the African HIV/AIDS epidemic and the havoc wrought with it, analysts in India and throughout Asia are in the process of forecasting the likely scale and spread of the epidemic in this region. In many cases, however, there exists relatively little published evidence on which to base any 'predictions'. Within this working paper we attempt to draw together as much information as possible on the extent of the epidemic of sexually transmitted infections (STIs), including HIV, in India. We concentrate on India not only because it is the largest country in the South Asia region (and the second most populous country in the world), but also because we believe it contains the potential for a widespread and sustained epidemic.

Given the well-recognised epidemiological synergy between sexually transmitted infections and HIV[1], we have outlined as much background information as possible on these infections. In part, this is because more has been known for a longer period of time about these infections in India than about the more recent *arriviste,* HIV. Whilst not using STI rates as a proxy for HIV, we do believe that understanding the epidemiology, risk factors and spread of these infections in India will help in identifying and defining the sites for more effective interventions against the spread of HIV. As such, we have concentrated upon STIs rather than on reproductive tract infections (RTIs) in general. While noting that the endogenous and iatrogenic infections among women are a significant cause of acute and chronic reproductive morbidity (and mortality in some cases), and the endogenous infections (such as bacterial vaginosis) may prove also to be co-factors in HIV transmission, it is important to bear in mind that they have different risk and predisposing factors compared to the STIs, and they need to be addressed by a different set of measures for prevention and care.

We start this working paper with a profile of the macro-level and structural factors which may contribute to the vulnerability of the Indian population for a widespread HIV epidemic. Next, we look at the epidemiology of STIs in India, and follow this with a summary of reported information on individual level behavioural risk factors for these infections. We then review the Indian health care system in general, and its response to STIs and HIV in particular. The final section of this working paper summarises all information gathered, and presents conclusions for future programmatic and research agendas.

1.1 Demographic profile

In May 2000, India joined China as one of only two countries with a population of more than one billion. Such statistics obscure the fact that India's population growth rate has, in recent years, been falling. From an annual average population growth rate of above 2% during the period 1961-91, it fell below 2% in 1996, and is currently growing at 1.6% per annum (down from 1.8 in 1997). An examination of the structural characteristics of India's population reflects a macro environment conducive to the increased transmission and incidence of STIs. In many societies, it is younger age groups who have higher rates of STIs – perhaps a reflection of increased sexual mixing at an age associated with general experimentation in all aspects of life. India has noted a decline in the proportion of the younger aged population (< 15 years) and a marginal increase in the proportion of older and elderly people; however, the population remains young with 36% aged below 15 years[2].

The size of the urban population has been steadily increasing and the pace of metropolitanisation (the growth of large cities) is accelerating[3]. Nonetheless, India continues to be a predominantly rural country with 74% of the population living in rural areas. The most recent figure available for population density, recorded in the 2001 census, shows a level of 324 per sq. km. India is one of the few countries with more males than females, with 933 females for 1,000 males according to the 2001 census. Except in the southern state of Kerala (where there were 1058 females per 1000 males in 2001) and the Union Territory of Pondicherry (ratio of 1001 females per 1000 males in 2001), the sex ratio is unfavourable to females[4].

1.2 Economic and social profile

A 1990s World Bank study of 50 low income countries noted that eight structural level variables could explain up to two thirds of the variation in HIV prevalence between countries: income distribution and measures of absolute wealth (GNP per capita) were two of the explanatory

variables[5]. India is a low-income country, with a GDP per capita of US$ 465 in 1997[6]. The structural adjustment programmes launched in 1991, intended to improve economic performance through market-oriented policies, may have contributed to an increase in the pace of economic growth in recent years. The Indian economy is expected to grow by 5.9% in 1999-2000[7]. However, the extent to which this improved economic performance has led to equity and social justice is disputable. Official estimates (for the year 1993-4) state that 37 % of the rural population and 32 % of the urban population are living below the income poverty line[7] with an income of less than US$1 a day, although some put this figure higher at one in two of all Indians living on a dollar a day[8]. Absolute poverty in India is compounded by inequalities in income distribution: during the period 1990-96, while the poorest 40% shared 21% of the total household income, the richest 20% shared 43% of household income[9].

Whilst poverty itself is not a direct 'risk factor' for STIs (including HIV), it may lead to an increased population vulnerability.

Whilst poverty itself is not a direct 'risk factor' for STIs (including HIV), it may lead to an increased population vulnerability, for example through changes in population mobility (e.g. young rural men migrating to cities without their families in search of work). Moreover, the ability of low income countries to provide widespread effective preventive interventions and services for clinical management is often compromised through an inability to ensure an adequate drug supply and to undertake screening for asymptomatic infections, or through the reduced ability of people in low income countries to access care from qualified practitioners[5]. In this regard, India and the entire South Asia region constitute one of the world's most vulnerable areas for STIs including HIV.

Nonetheless, the economic picture in India, as in much of South Asia, is not totally bleak. Economic liberalisation policies have opened up the Indian market to outside investment, and India now has, for example, one of the strongest computer software industries in the world. The challenge, as shown above, is to encourage economic growth beyond a few highly selected urban areas and develop means for equitable distribution of income and wealth.

Geographical disparities in the levels of economic development are very profound in India. These have continued to influence migratory patterns from impoverished rural areas to prospective urban destinations. Selective migration of males has been a traditional feature of internal migration, especially when migration has been pursued for economic gain. Most of these migrants are married, and they leave behind their families in the villages and occasionally return to visit them[10]. An increasing volume of internal migration combined with growing urbanisation may have profound implications in terms of the overall incidence of STIs in the country. Available information on the prevalence pattern of STIs in the country already reflects some of these trends. For instance, the highest reported prevalence of STIs during the period 1984-88 was in the states of Maharashtra and Tamil Nadu which were the most urbanised states in the country at the time of the 1981 census[11].

In addition to the urban-rural divide, there are consistent differences in indicators of socio-economic development between the north and south of the country, with the southern Indian states repeatedly outperforming the central belt and parts of the north. Kerala, long held up as a model of development policies, has health outcomes comparable to those of many higher-income countries, despite being economically backward. Infant mortality and under-five mortality rates in this southern state are less than one third of those for India as a whole[12].

Despite various initiatives to achieve universal primary education, India continues to have a very high proportion of people who have not received any education, especially among girls and women. In 1997, half the adult female population was classed as illiterate. Latest figures from the most recent (1998-99) National Family Health Survey (NFHS-2) show that even among the age group 15-19 years (which might have been expected to benefit more from education policies in the recent past), 32% of girls and 15% of boys are illiterate[13]. Rural-urban and regional disparities in the level of literacy are significant; again the southern states generally perform much better on these indicators. Literacy rates in Kerala are 86% for girls/women and 93% for boys/men whilst comparable figures for Bihar in up%ral India are 29% and 57%[12]. The combined national primary, secondary, and tertiary gross education enrolment ratio for females is 47%, compared to 62% for males[6].

Other indicators of gender disparities are equally profound. In the prevailing patriarchal environment, women's status is low. Women's access to schooling (as noted above), paid employment, and appropriate health care is limited. Health outcomes for women show an

inegalitarian pattern: contrary to the expected longer life expectancy for women in most areas of the world, life expectancy in India is almost equal between men and women[14] (although a slight improvement in women's life expectancy over men's has been observed from the 1980s onwards). Disability Adjusted Life Years (DALYs) lost per annum are greater for women than men[15] and the highest level of DALY disparity is in the reproductive age groups (15-44 years) – a reflection perhaps of the high levels of all-cause reproductive morbidity suffered by women.

In brief, various contextual and structural factors prevailing in India, such as a high proportion of younger age groups in the population, the increasing pace of metropolitanisation and other types of internal population mobility, the unbalanced male-female ratio (leading to an excess of men in cities), geographical and economic disparities, and the vast number of illiterate people, are generally favourable to an increased incidence of STIs, including HIV, across the country. Given the prevailing gender disparities in all fields of life, women in India are and will be disproportionately affected by the risk of STI transmission.

2. Epidemiology of STIs in India

As shown in the introduction, India displays a remarkable level of heterogeneity in all aspects, including the recorded epidemiology of STIs and HIV. Such epidemiological diversity is a reflection of the size of the country, of the "phase" of the STI/HIV epidemic in any one place (rising, stable or declining), and, equally, of the highly variable broader contextual factors influencing prevalence and incidence rates and the ability of the health care system to record and respond to these rates.

Reliable data on the incidence and prevalence of sexually transmitted diseases (STDs) and sexually transmitted infections (STIs)* are limited, mainly due to the inadequacy of the existing surveillance system. It is estimated by the National AIDS Control Organisation (NACO) that the annual incidence rate of STIs is around five % of the adult population, which implies that about 40 million new STI cases are occurring annually in the country[16]. The burden of disease estimates carried out for the World Bank show that in 1990 approximately 5.6 million Disability Adjusted Life Years (DALYs) were lost due to STIs in India, excluding HIV, with the loss being twice as high for females (3.7 million DALYs) compared to males (1.9 million DALYs)[17].

It is acknowledged by the authors of the above-mentioned World Bank report and others[18] that the data sources for such estimates are very limited. Indeed, in the case of DALY estimates for India, predictions were made despite the fact that "no studies were identified providing information on the prevalence of chlamydia" and nine studies formed the basis of the gonorrhoea

* In this paper we have distinguished between the terms STDs – which are associated with symptoms and signs of disease; and STIs – which acknowledges that many infections are carried asymptomatically.

and syphilis estimates[17]. Nonetheless, there are increasing numbers of studies available from India which show the prevalence of selected reproductive tract infections in both population-based and facility- or convenience-based samples. The results of these studies, many of which were carried out in the 1990s, are explored below.

Before examining the reported epidemiology of STIs in any detail in India, it is critical to bear in mind possible reasons contributing to epidemiological diversity. Most important among these is the recognition that studies cited do not use either comparable sampling methods or even laboratory diagnostic tests. It is well recognised that a lack of standardisation in laboratory criteria can influence the prevalence reported[19] . In the case of syphilis, for example, some studies report all rapid plasma reagin (RPR – a screening test for syphilis) positive cases, whilst others report only those confirmed by *Treponema pallidum* haemagglutination assay (TPHA – a confirmatory test for syphilis). Diagnosis of other pathogens, such as *Chlamydia trachomatis*, shows an even wider variation in methods and standards used, and as a consequence, a highly variable reported prevalence. Besides, in many studies the laboratory methods used are either inadequately explained or are not detailed at all. Retaining this critical perspective on the published data is important for both understanding the current reported figures, and for designing future research and control programmes. We report on the epidemiology of bacterial/protozoal STIs and viral STIs separately. Whilst the risk behaviours for these infections may coincide, their epidemiology varies by virtue of the fact that the viral STI rates are taken to represent lifetime exposure, whilst rates for the other pathogens reflect more recent infection (in the case of syphilis we have tried as much as possible to present data on recent/untreated infections separately from data on those people who exhibit either lifetime exposure or untreated infections). In the case of HIV (and all other pathogens) we concentrate on sexual transmission of the virus since this represents the vast majority of cases where the route of transmission is known. In most sections we have presented the data for men and women separately.

2.1 Bacterial and protozoal STIs in men

A review of the existing literature (published and 'grey') highlights a remarkable gender disparity – the vast majority of facility-based studies and community-based studies in India have thus far focused on examining STI rates in women. We located only two surveys of STIs among men in communities in India: a population-based survey of STI prevalence in Tamil Nadu[20] , and a survey of men participating in a rural education project in Maharashtra[21] (see Figure 1 for the location of all states in India). Whilst this may reflect the perceived burden of disease imbalance, it is also

Table 1: Published STI Rates Among Men in India

Study population	*Prevalence ranges (%)*								
	GC	CT	Syphilis	Chancroid (clinical diagnosis)	TV	HSV (clinical diagnosis)	HPV (clinical diagnosis)	HbsAg	HIV
Community-based or convenience samples									
Males aged 15-45 years[20]	3.4	2.0	0.3	—	—	—	—	6.0	1.4
Male participants of a community education programme[21]	1.7	15	—	—	5.6	—	—	—	0.4
Transport & industrial workers[17]	2.1	—	0.8-4.4	—	—	—	—	—	—
Facility-based									
STD clinic patients[22] [23] [24] [25] [26] [27] [28] [29]	8.5 -25.9	20.0 -30.0	12.6 -57.0	16.1 -34.7	—	3.0 -14.9	4.9 -14.3	—	2.0 -7.4
STD clinic patients with genital ulcers[30]	—	—	—	33.0	—	—	—	—	—
Patients attending primary health care[17]	—	—	3.6	—	—	—	—	—	—
Specific groups									
Spouses of females with candida & trichomonas[31]	—	—	—	—	60.6	—	—	—	—

Notes: GC = gonorrhoea; CT = *Chlamydia trachomatis*; TV= *Trichomonas vaginalis*;
HSV = herpes simplex virus; HPV = human papilloma virus; HbsAg = hepatitis B surface antigen;
HIV = human immunodeficiency virus

clear that we know a lot less about STIs in Indian men than in Indian women. Such a data imbalance has the potential to lead to unbalanced programme responses and interventions.

Table 1 summarises published information on STI rates among men in India. In the following section we use the case of syphilis to highlight the problems with reporting 'prevalence' from studies using different sampling methods and variable laboratory methods. In a community-based study of men in Tamil Nadu, 0.3% of the respondents were TPHA positive[20] (and the only other survey of men in a community[21] did not report on syphilis seroprevalence). In contrast, studies among male transport and industrial workers in Jaipur (Rajasthan) reported a prevalence of 4.4%[17] (VDRL+ with TPHA confirmation), and in Chennai (Tamil Nadu) 0.8% of industrial workers, 4.4% of transport workers, and 3.6% of male patients attending a primary health centre[17] were found to have syphilis, but no details of diagnostic criteria are given. Studies among male patients attending STI clinics have reported syphilis prevalence ranging between 13 and 57%[22 25 26 28], again with variations in diagnostic criteria: primary syphilis in 12% and secondary syphilis in 3% in Allahabad[22] (Uttar Pradesh, no diagnostic details given); no distinction between primary and secondary syphilis, and no details of laboratory techniques, but a reported prevalence of 12.6 % in Rohtak[28] (Haryana), 29.7% in Patiala[26](Punjab) and 57% in Mumbai[25](Maharashtra).

Such variations in samples and methods complicate any comparisons between studies, and make the description of a single "Indian scenario" highly problematic.

2.2 Bacterial and protozoal STIs in women

Whilst there is more information available on the epidemiology of selected STIs among women in India than among men, the data are still relatively patchy and certainly incomplete given the size of the population. The 1980s and 1990s witnessed a large number of studies undertaken to study the community-based prevalence of gynaecological morbidity, especially reproductive tract infections (RTIs) in various parts of India. Many studies relied upon self-reported morbidity and did not validate with laboratory confirmed diagnoses. Nevertheless, these and other studies have contributed enormously to our understanding of the prevailing epidemiology of RTIs, including STIs, in Indian women.

Table 2 details the prevalence ranges for selected STIs in women in both community-based and facility-based surveys.

Table 2: Published STI Rates Among Women in India

Study population	*Prevalence ranges (%)*								
	GC	CT	Syphilis	TV	HSV (clinical diagnosis)	HPV (clinical diagnosis)	Cervical dysplasia	HbsAg	HIV
Community-based									
Ever/currently married women [32 33 34 35 36 37]	0.0 -4.2	0.5 -28.7	0.2 -8.8	4.3 -27.4	—	11.8	3.8% Grade III dysplsia	—	—
Unmarried & married women [20 38 39]	0.3 -3.9	5.2	0.2 -10.5	0.8 -14.0	—	—	—	4.8	2.0
Facility-based and convenience samples									
STD clinic patients [22 25 26 28 29 40]	1.3 -10.4	—	29.3 -43.3	—	4.0 -15.4	6.7 -15.6	—	—	1.2 -13.6
Sex Workers [40 41 42]	4.9 -16.5	—	30.0 -63.0	—	—	0.5	—	—	49.9
Gynaecological OPD patients [43 44 45 46 47 48 49 50 51 52 53 54]	1.0 -5.5	0.2 -31.3	4.4 -5.6	0.4 -26.0	0.3 -25.0	0.6 -42.4	9.2% severe dyskaryosis 5.4% invasive carcinoma	—	0.0
Antenatal patients [17 43 55 56 57 58]	—	2.3	1.0 -6.2	17.8	—	—	—	—	0.1 -1.2
Gynaecological patients with 'vaginitis' complaints [59 60 61]	0.0 -2.6	2.6 -12.2	2.2	1.6 -17.6	—	—	—	—	—
Gynaecological patients with 'cervical erosion' [62 63]	—	3.0	—	—	—	—	1.6% moderate dysplasia 1.3% severe dysplasia 1.8% malignant	—	—
Infertility and PID patients [64 65 66 67]	0.1 -11.0	0.5 -24.2	0.5	0.5	—	—	—	—	—
Acceptors of tubal ligation [67 68]	0.1 -2.2	0.0 -0.2	0.5 -7.0	0.9	—	—	—	—	—

Notes: GC = gonorrhoea; CT = *Chlamydia trachomatis*; TV= *Trichomonas vaginalis*; HSV = herpes simplex virus; HPV = human papilloma virus; HbsAg = hepatitis B surface antigen; HIV = human immunodeficiency virus

As with the studies conducted amongst men, there is a wide variation in sampling and laboratory methods used in the reported studies among women. For example, most information on the prevalence of chlamydial infection comes from case-control studies conducted among specific (and probably higher risk) sub-populations such as women with pelvic inflammatory disease (PID), infertility, repeated abortions, or poor obstetric history. Evidence of chlamydial infection (through serological diagnosis for the presence of chlamydial antibodies) ranging between 0.5 and 24 % has been detected in women with PID and infertility[65 66 67]. Other studies have relied upon the more usual diagnostic criteria of detection of chlamydia antigen, but a wide variety of laboratory methods have often been used, sometimes within the same study. Moreover, some researchers have used several screening techniques and reported positivity with any method (i.e. no 'gold standard' confirmation, all *screening* tests are counted as positive).

India displays a remarkable level of heterogeneity in all aspects, including the recorded epidemiology of STIs and HIV which is a reflection of the size of the country, of the "phase" of the STI/HIV epidemic in any one place and, equally, of the highly variable broader contextual factors influencing prevalence and incidence rates and the ability of the health care system to record and respond to these rates.

There are wide variations in both the reported prevalence of syphilis and diagnostic criteria used. In the general female population (as found in community-based studies) RPR or Venereal Disease Reference Laboratory (VDRL – a screening test for syphilis) positive cases (no TPHA confirmation) range between 0.2 and 10.5 %[33 34 36 38]. One study reported results with TPHA confirmation of VDRL positive cases: 4.2% seropositivity among 332 women in a Delhi slum[32]. Another community based study, this time among rural women in Tamil Nadu, reported TPHA positivity only in 1.5% of 451 women tested (a further 0.2%, 1 woman, was found to have current syphilis infection, diagnosed by RPR positive serum)[35]. The reported prevalence of syphilis among gynaecology patients again varies according to diagnostic criteria in use: in Allahabad, 2.8% of 500 gynaecology patients were reported as having syphilis (no further details given)[43], whilst in Delhi 5.6% of 144 women were found to be TPHA positive[47]. Another Delhi-based study among

women in a family-planning clinic found 2.2% of 319 women were VDRL positive[59]. Studies among antenatal populations have reported seropositivity rates ranging between 1 and 6 %, again varying according to diagnostic methods reported. WHO data report 1% of 9,380 ANC clinic attendees to be VDRL positive in Delhi[17], whilst 5% of 10,181 antenatal clinic (ANC) women in Mumbai[56] and 6.2% of 250 pregnant women in Allahabad[43] are reported as having syphilis (no further details given). Reports covering the period 1968-88 present syphilis rates (as defined by VDRL positivity) ranging from 7-23% among pregnant women in different locations in the country[69].

Sex workers and women attending STD clinics have been found to have even higher rates of syphilis. For example, among female attendees at STD clinics, between 29 and 43 % have been diagnosed with syphilitic infection: primary syphilis in 4% and secondary syphilis in 40%, but with no details of laboratory methods[22] in Allahabad (Uttar Pradesh); 29.7% in Mumbai[25] (Maharastra) and 29.3% in Patiala[26] (Punjab) (no laboratory or diagnostic details given). Similarly, studies among sex workers (SWs) have found a higher prevalence of syphilis. Among 360 brothel-based SWs surveyed in Kolkata (formerly Calcutta), 58.8% were reactive by VDRL and 63% were TPHA positive[41]. A survey of 200 SWs attending a general health clinic in Pune (Maharastra) found 37% diagnosed with syphilis (no further details given)[42].

Although variations in sample size and diagnostic procedures account, to some extent, for the differences in reported prevalence, the high prevalence of syphilis among women in some parts of the country is in little doubt. Despite this, prevention of mother-to-child transmission of syphilis (through antenatal screening of all pregnant women) is only patchily implemented throughout the country.

2.3 Viral STIs (except HIV) in men and women

Aside from HIV, data on other viral STIs, apart from hepatitis B, are lacking in India. The major route of hepatitis B transmission is believed to be mother-to-child or during childhood, although there is also evidence of the role that non-sterile injection practices may play in transmitting the virus in adult populations [70] [71] [72]. Recent studies have documented the Indian population as having an intermediate hepatitis B prevalence[73] (2-7% prevalence of carriage of hepatitis B surface antigen in the general population), and researchers have recommended universal immunization of neonates as the appropriate strategy for control[74]. The inclusion of hepatitis B into national immunization programmes has been a WHO-recommended policy since 1992 [75], and has been

shown to be a highly cost-effective strategy in India[76]. Despite such evidence, the country is beginning a vaccination strategy in 15 pilot districts only this coming fiscal year (WHO country office, Delhi, personal communication).

The prevalence of genital herpes in general male and female population in India has not been explored in any of the community-based studies, and there are no community-based sero-epidemiological studies on the prevalence of antibodies to HSV-2, although some are planned. Nonetheless, a small number of studies have documented that clinical evidence of infection is not uncommon among men and women in STD clinics. Studies in such settings among men have observed that between 3-15% were diagnosed clinically as suffering from genital herpes[22 25 26 28]. Prevalence rates of 0.3 to 25 % for antibodies to herpes simples 2 virus (HSV-2) have been found among female patients attending gynaecology and obstetrics out-patient departments[47 48 50] and rates of 4 to 18 % have been found among female patients attending STD clinics[22 25 26].

An estimated 90,000 new cervical cancer cases arise annually among Indian women. Despite the fact that this is one of the commonest cancers among all women, little data exist either on the prevalence of different types of cervical dysplasia among women, or on the number of women (and men) infected with human papilloma virus (HPV). Only one community-based study among women in a Delhi slum has reported on the prevalence of HPV infection: 12 and 3.3 % of 152 women had clinical evidence of HPV16 and HPV18 infection (the two papilloma sub-types linked to an increased risk of developing cervical cancer) respectively[32]. Rates of HPV infection diagnosed among both male and female STD patients have been found to be similar and in the range of 5-16%[22 25 26 28]. Clinical HPV infection (which is not necessarily caused by the cancer-associated HPV sub-types) was reported in 0.6% of a large sample (N=69595) and 7-42% of smaller samples of gynaecological patients[45 47 54]. Prevalence of cervical dysplasia is similarly little understood: only one study reports on cervical dysplasia in women in a community (28/734; 3.8% of rural women living in 20 villages close to a tertiary care facility)[37]. Data from other studies are presented in Table 2 – note the differing classification systems used in each study.

2.4 HIV in India

The first HIV-positive person was identified in India in 1986, and there has since been a rapid spread of the epidemic in different parts of the country. Accurately estimating the number of HIV positive people in the country is, however, difficult – in part due to the wide national variation in

contextual factors which may put people at risk (e.g. rates of partner change, urban rural divide, STI rates, prevalence of injecting drug use). However, the National AIDS Control Organisation carried out a consultative modelling exercise late in 1999 to review the figures for the year 1998. Using the HIV sentinel surveillance data as a basis for modelling estimates, they calculated that in 1998 approximately 2.7 million people were infected (range: 2.3 – 3.5 million), and that the geographical distribution of these people was as follows: 1.36 million urban males, 0.5 million rural males, 0.86 million urban females and 0.2 million rural females[77]. As of June 2000, there have been a total of 12,389 people diagnosed with AIDS and 98,451 HIV positive people identified through HIV sero-surveillance[77]. Using these figures, it is currently estimated that there are approximately 3.7 million HIV positive persons in India, one of the highest numbers in any country globally. Most of these infections have been acquired through sexual transmission (80.8%), with a smaller number (5.1%) found in injecting drug users, people who have received infected blood (5.5%), and a relatively low number of cases infected through mother to child transmission (0.8%)[78].

India, like many countries, does not have a single HIV epidemic, but has multiple epidemics in different geographical settings and among different people with different types of risk.

India, like many countries, does not have a single HIV epidemic, but has multiple epidemics in different geographical settings and among different people with different types of risk. Initial cases were reported among female sex workers in the cities of Mumbai and Chennai, and among injecting drug users in the north-east of the country (especially in the state of Manipur[79]). Since then, however, there has been a diffusion of the epidemic away from recognised 'risk groups', and into the so-called 'general population'.

In 1998, the estimated male:female ratio of HIV infection in India was approximately 1.8:1[77]. Studies show that the number of cases in women infected through heterosexual transmission within marriage is increasing. A seroprevalence of 13-24% HIV has been reported among female STD clinic patients who did not report themselves to be selling sex [40 80 81 82]. In addition, a number of small-scale studies have reported that anywhere from 6 to 85 % of wives of HIV-

Source: [88]

infected intravenous drug users and STI clinic patients were HIV positive[83 84 85]. Studies which have examined the prevalence of HIV infection in married women have found that husbands' reported behaviour was the major risk factor for many women[40 81 86 87].

The seropositivity rate among pregnant women in selected sentinel sites ranges between zero and over 2% (in the states of Maharashtra and Karnataka), and as high as 6% in some areas of slums of the city of Mumbai[16]. See Figure 1 for an overview of HIV rates among antenatal women – data collected during sentinel surveillance.

2.5 Summary of epidemiological data

The HIV and STI data in India highlight the huge variation in reported and recorded prevalence in the country. In the absence of a fully functioning STI surveillance system, predictions and estimates are made on the basis of *ad-hoc* surveys, often among facility-based or convenience samples. There are few systems for passive surveillance in operation, and even fewer longer-term surveys in existence which might be able to show trends with time. Given this, it is impossible to describe the 'Indian scenario' *per se*, instead it is only feasible to report the results from community-based and other studies of STI/RTI prevalence, and the data from HIV sentinel surveillance.

As mentioned in the introduction to this section, a critical review of many of the studies reported here reveals highly variable methods in use, especially in relation to laboratory diagnosis. Nonetheless, there are a number of summary points which can be made in relation to the data presented above:

- Data on STI prevalence in men are lacking, especially men in the 'general population';
- Rates of all STIs are generally higher in urban areas than in rural areas;
- The epidemic of HIV is spreading rapidly in India, and is moving beyond recognised 'risk groups' into the wider population in some areas; and
- Interpretation of data from India is complicated by the wide variety of methods for laboratory diagnosis. The need for standardisation of laboratory methods is particularly crucial in any future studies.

3. Risk Factors for STI/HIV Transmission in India

India, like other countries, has a wide variety of individual, community-level, and structural factors which place some people at higher risk of STI transmission. In the introduction we outlined the broader contextual factors which contribute to the sustained (and increasing) prevalence of these infections. In the following sections, the nature of individual-level reported risk has been highlighted. In all studies reported below, however, it is important to be mindful of similar caveats as outlined with the studies of STI prevalence. For example, the definition of "sex" is not clearly articulated in many studies: is it confined only to penetrative vaginal sex, or are other types of sexual experience being recorded? Similarly, definitions of types of sexual partnership are often not well defined within study reports: what and who constitutes a 'casual' partnership/partner, and how is 'commercial sex' defined? Such a lack of methodological information makes the results of many studies difficult to interpret and to compare with one another.

3.1 Nature of sexual networks

Although India produced a detailed treatise on sex and love in the third or fourth century of the Christian era, namely Vatsyayana's *Kama Sutra*, in modern India sexual behaviour has not been discussed openly or researched seriously until recently. The HIV/AIDS epidemic has stimulated a proliferation of research in this area in India. Previously unexplored topics have now entered the domain of public discourse, with media articles now regularly featuring HIV/AIDS and sexual behaviour as their subjects.

Recent studies have provided valuable insights into the nature of sexual behaviour in selected populations in India. However, to date, no studies on sexual networking have been published. Some studies of this type are currently underway in a small number of sites, but in this paper we are restricted to recording the reported level of different types of sexual behaviour. In the subsections below, sexual behaviour patterns within commercial and non-commercial sex are discussed.

3.2 Commercial sex

Prostitution, or sex work, has a very long history in India; the topic was discussed in texts written as far back as the third century B.C.[89] . The number of sex workers (SWs) in India is hard to estimate. However, some non-governmental organisations (NGOs) working with SWs have provided 'guesstimates' for the major cities: between 100,000 and 150,000 female SWs and 2000 male transvestites or eunuchs engaged in male to male sex (MSM) activities in Mumbai; 100,000 SWs in Kolkata; 40,000 in Delhi; 40,000 in Pune (Maharastra); 13,000 in Nagpur (Maharastra); 7,000 SWs in Ahmedabad (Gujarat); and 6,000 SWs in Chennai (Tamil Nadu) [89 90] .

Female SWs can broadly be categorised into four groups – brothel-based; home-based and part-time; street-based; and call girls[91] . Brothel-based SWs constitute the major proportion of prostitutes in the majority of the cities in India. However, there are many cities where there are no established brothels. Brothels vary from highly restrictive arrangements with no freedom of mobility for the women, to a more contractual agreement where women present themselves at the time required by the brothel owner. Normally, pimps or brokers bring customers to brothels. Brothel owners in most cases control the earnings of women working there.

Home-based SWs function independently or through known brokers and networks. The style of operations and the socio-economic status of the home-based SWs vary across cities. Part-time workers are those who are primarily engaged in other occupations, which may provide access to clients. There are also women who sell sex according to seasonal economic need. Street-based workers come mostly from the lowest socio-economic stratum of society. They seek customers independently. They are the least protected of all SWs and are highly mobile. There are 'day workers', 'night workers', and those working along the highways to serve truck drivers. Call girls work clandestinely through trusted agents or independently and cater to middle and upper class customers – a hidden lifestyle which may make them less easily amenable to prevention methods and messages [91].

The male clients of SWs are a heterogeneous mixture representing all socio-economic strata of Indian society. The various types of SWs referred to above will each have their different 'catchment' groups of clients. A few studies that have examined the number of clients served by SWs reported that they see, on average, 3 clients a day[92 93 94] . However, a study in Surat (Gujarat) reported that SWs in this city saw, on average, 10-12 clients per day [91].

There are few reports from population-based surveys on the numbers of men who have paid for sex. A study in Orissa found that 15% of men (urban and rural) reported payment for sex at some point in their lifetime, and other studies have found between 8 and 29% of men have paid for sex[95]. One common feature observed in all the studies is that men often go to sex workers in groups[96].

3.3 Non-commercial sex, non-marital sex

The prevailing family system in India is based on monogamous marital sex – and is especially enforced for women. Premarital chastity and marital fidelity are still valued, again, predominantly for women. However, a number of small-scale studies, despite limitations in their design and methodologies, have observed a more permissive attitude towards sexual pleasure and comparatively high (at least, higher than culturally perceived or expected) levels of premarital and extramarital sexual activity among men and women in India.

A number of studies which have explored sexual behaviour among predominantly unmarried school and college students, mostly in urban centres, have reported sexual activity among 8-39% of male students and among 1-20% of female students[97 98 99 100 101 102 103 104 105]. Studies in the general population, in both rural and urban areas, have reported premarital sexual activity among 7-48% of male respondents and 3-10% of female respondents[35 36 95 106 107 108 109 110 111]. A study in tribal villages in Maharashtra reported higher levels of sexual experience among unmarried girls, with nearly half of all unmarried girls found to be sexually experienced* [38] as diagnosed on gynaecological examination. Again, the problem with making any generalisation from the results of these multiple studies is that different methods have been used and diverse definitions of sexual activity are common. For example, is it possible to compare self-reported sexual activity with 'sexually experienced' diagnoses made on clinical examination? Often, the exact methods and definitions are not outlined in study methods, thus making comparisons even more tenuous.

Small-scale studies among groups such as STI clinic patients and truck drivers have reported a higher level (81-98%) of premarital sexual experience[112 113], compared to rates in the general population. Reports of STI clinic patients have shown that between 7 and 22% of male patients (the majority of them were unmarried) and between 12 and 44% of female patients (the majority

* Premarital sexual experience was defined when the hymen was found to be torn and when it was easy to insert two fingers into the vagina on pelvic examination.

of them were married) were teenagers [26 28 114]. These studies suggest that sexual activity at younger ages outside a marital union is not as uncommon as generally believed.

However, others have argued that premarital sex is not the norm, and that for the majority of people, their first sexual experience occurs within marriage [96]. A recent large population-based survey in Orissa among over 2000 urban and rural men found that only 25% had sex before marriage, and the overall mean age at first sex was 23 years [95]. Even studies among college boys (where social constraints may be relaxed) have found that less than one third report sex before marriage[115].

Reports (often from qualitative studies) of premarital sexual contacts of men have found a wide variety of partners: SWs; friends; relatives; and future spouses[35 36 95 99 100 106 109 110 116]. Among girls, reported premarital sexual contact is mainly with future spouses, friends and relatives[36 101].

The few studies which have looked at the extent of extramarital sexual activity (i.e. non-spousal sex reported by married people) in the 'general population' have found relatively low reported levels. These studies have reported extramarital sexual experience among 2-6% of women and 4-12% of men[35 36 95 100 109 110 112]. It is hard to say whether these figures accurately reflect reality or if they are an underestimate due to fear of disclosure. Many of the studies of sexual behaviour suggest that men often pay for extramarital sex. Extramarital sexual intercourse with friends and relatives has also been reported, but to a lesser extent.

A review of reports of STD clinic patients suggests that the extent of extramarital sexual activity is probably higher in this group. Between 30-60% of all male patients diagnosed with STDs were married and 50-98% of them reported extramarital relationships[26 28 30 114 117 118]. Similar reports from female STD clinic patients found that between one in five and one in two women mentioned husbands as the source of their STD[26 28], suggesting that many women may have been infected through other partnerships.

3.4 Male to male sexual activity in India

Male to male sexual activity has been described in India since the time of the *Kama Sutra*. However, open discussion of men having sex with men (MSM) is not well tolerated in a society which continues to place extremely high values on the family and lineage. Recent research has concentrated on describing the practices, lifestyles and cultures of MSM in India, but not on

hypothesising the extent of the practices among men. In part this may be a result of the often hidden nature of male to male sex in India. Researchers in two recent studies found that most men reporting MSM were married, and they met their sex partners in covert and discreet surroundings[119] [120]. Most of the interviewees first had sex with another man/boy at a relatively young age and most reported non-penetrative sex most commonly. Perhaps because of this, use of condoms was relatively infrequent,[96] although it has been reported that 15-20% of older men regularly used condoms[119].

The possible contribution of male to male sex to the HIV epidemic in India is not recorded as a separate category. Defining this is likely to be a difficult task given the hidden nature of MSM in the country. For example, the fact that most MSM interviewed in studies are married, may lead to their being classified as heterosexual in any survey of HIV prevalence.

4. Responses to Risk and to Infection

4.1 Primary prevention of STIs – barrier methods

The use of condoms in marital and non-marital sexual relationships is very limited in India. Method-specific contraceptive targets were only removed from the national agenda in April 1996[121]. One result of a target-driven approach has been the predominance of permanent contraceptive methods. The National Family Health Survey (NFHS-2), conducted during 1998-1999, reports that 48.2 % of all married couples were using any (traditional or modern) method of contraception and that among 71% of these couples, the wife had undergone a tubectomy (i.e. 34.2% of all married women aged 15-49 years are sterilised)[13]. The same NFHS found that only 3.1% of married couples were currently using condoms as a method of family planning. The number of married couples who use condoms to prevent transmission of infection is not recorded. However, studies on the acceptability of dual methods of protection are currently planned.

The use, especially the consistent use, of condoms in non-marital sexual liaisons is also reported to be very low. Studies among the 'general' male population who reported non-marital sexual experience found that between 50% and 88% never used condoms during such encounters and a very small proportion (4-13%) reported always using condoms during non-marital sexual liaisons[36 95 103 109]. Studies among groups at perceived or known higher risk (SWs and their clients) have shown that between 4% and 23% reported always using condoms[40 122 123].

Besides condom use, other barrier methods for prevention of pregnancy and protection against STIs are not commonly used in India. In part this is due to their non-availability in a system still attempting to expand away from its previous single-method domination. Moreover,

the client acceptability of other barrier methods is not well understood in the Indian context. Similarly, there are little data on the acceptability of microbicides for HIV prevention – if these become available – although clinical trials of microbicides are currently underway in the country.

4.2 Reported morbidity, health care seeking, compliance with treatment, and partner communication

Much information on the prevalence of STI/RTI-associated morbidity in India comes from recent studies, referred to earlier, on self-reported gynaecological morbidities**.** These studies, found that between 13% and 57% of women reported a current abnormal discharge[124] . In many of these studies reported symptoms were equated synonymously with the presence of RTIs (including the endogenous infections) in women. Such a correlation is ambiguous and usually poor, even at the best of times[125] , and the co-ordinators of the studies recognise the need for laboratory-based information in addition to self-reported morbidity[124].

Only 3.1% of married couples were currently using condoms as a method of family planning. The use, especially the consistent use, of condoms in non-marital sexual liaisons is also reported to be very low.

In India, the relationship between these reported symptoms and the presence of a biomedically identifiable infection as their cause, is compounded by the widely prevalent Ayurvedic belief system which equates discharge syndromes (*dhatu* loss) with loss of bodily power. Studies among both men and women have found a high prevalence of reported "abnormal discharge", but frequently with no biomedically defined cause for these symptoms[126] [127] . These findings highlight the role of culturally defined illness patterns in health seeking for possible RTI/STI symptoms in India (and possibly in other South Asian countries as well), and stress the importance of understanding the cultural background underlying results from large-scale studies.

Systems of health belief are not, of course, confined to women. Surveys among men in India have highlighted similar patterns of reported morbidity and causality. A large-scale population-based survey of sexual health problems among over 2000 men in rural and urban Orissa found that the most common concerns among men related to sexual health in general, and psychosexual

concerns in particular. The most frequently cited symptom was "*dhatu phadiba*" – involuntary semen loss, believed to be due to excessive heat in the stomach, an improper diet, or sexual causes such as excessive masturbation or prolonged sexual abstinence. This was reported by over a quarter of respondents as their main sexual health problem[95]. This finding has been echoed in other studies which highlight the importance of general sexual health concerns (and specifically, psychosexual problems) in men relative to their concerns about STIs[126]. From a public health perspective, the importance of these findings relates to the cultural meanings and explanations of causality that give rise to them: these will determine the pattern of health care seeking (if any) that a person with symptoms deems to be appropriate.

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Treatment seeking in India is determined by a number of contributing variables, among these are: perceived seriousness and causality of symptoms; availability of health care; costs (including opportunity costs) of treatment; perceived and actual quality of care (including confidentiality of symptoms); accessibility of different types of care; and belief systems concerning the appropriate provider to consult. There is a strong and prevalent system of indigenous medical care in India and a multitude of different providers in the formal and informal sectors. All of these factors contribute to where, when, and why people seek care.

Indian studies have reported wide variations in treatment seeking behaviour. A few studies have reported that only a small proportion of women seek treatment for gynaecological symptoms[34 35 38 128]. However, a number of studies have reported that 50-78% of the women with gynaecological symptoms have sought some form of treatment[36 129 130 131 132 133]. Some studies have found that women with gynaecological complaints may delay seeking treatment[36 133]. For example, symptomatic women in a study in rural Tamil Nadu waited, on average, for a month before

seeking any treatment[36]. A qualitative study among Gujarati women reported the sequences of treatment seeking for a variety of reproductive health problems including 'white discharge', uro-genital problems, menstrual problems, infertility, and uterine prolapse. The study found that women mainly seek treatment from allopathic practitioners (private, qualified or not, and qualified government providers)[131].

Much less is known about the health seeking behaviour of men with possible STIs, as very few studies have examined male treatment seeking behaviours. Some of these studies have observed that men also suffer in silence or resort to self-treatment for STIs and other sexual health problems[36] [134]. A few studies, however, have reported that between one-half and all symptomatic men consulted someone or sought allopathic treatment[111] [135].

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A review of studies of male STI clinic patients shows that though higher proportions of men than women seek curative care for STIs, the pattern of their treatment seeking is quite inadequate for a complete cure of the infection and a further transmission of infection to sexual partners is likely. For instance, Ganguli and colleagues[136] reported that only slightly more than one-third of patients completed the recommended treatment regimen and nearly one-third had resorted to self-treatment with antibiotics before seeking treatment from STI clinics.

Women in three studies reported that they often did not inform their husbands about their gynaecological symptoms [36] [133] [137]. Women are often, as noted by Ramasubban[138], 'too afraid and confused to bring this [symptoms] to the notice of the family ..., both because they are not supposed to have such problems in the first place and also because they are socially deemed to be polluters,

the originators of sexual problems'. In contrast, Patel[139] and Oomman[132] both reported that women discussed their symptoms with their husbands.

A study among married women and men in rural Tamil Nadu reported that only slightly more than one-third (37.3%) of women with symptoms of possible RTIs, and one-fifth (19.9%) of the symptomatic male respondents informed their spouses about their illness experience[36]. Both men and women often talked indirectly about their genital illness experience to their spouses, using symbolic expressions and gestures and leaving the 'informed' spouses to guess about their partners' illnesses.

5. The Health System in India

5.1 Basic public health organisation and infrastructure

Public health in India has been a stated government priority since independence. Nonetheless, current spending in the broad health sector is only 0.7% of GNP[140], with a per capita health expenditure by central government of approximately $1 per annum[141]. Although there has been an attempt in recent years to increase the %age of spending in social sectors (such as education, health, and social welfare), their overall share of aggregate government expenditure has not increased. The share of central government expenditure on health and family welfare has remained stable at less than 2% of the total during the last decade. In contrast, the share of expenditure on debt interest payments has increased from 23.9% in 1991-92 to 29.9% in 2000-1 and the share of defence expenditure out of the overall expenditure has risen from 14.7% in 1991-2 to 17.3% in 2000-1[142].

The emphasis of government policy and priorities in health has shifted in keeping with the wider currents of debate about the meanings of public health and, more specifically primary health care (see, for example, Walsh and Warren[143] or Rifkin and Walt[144]). In recent years, both the public and private social sectors in India have undergone a series of changes as a result of both internal pressures (the demands of the growing middle classes fostering the development of private services, for example), and external forces (the donor-driven structural adjustment policies of the 1990s, for example). The health sector has mirrored the structural changes occurring in Indian society (see Qadeer[145] for a review of this area).

Financing for the health programme is divided between state-level and central-level expenditures (for example, public health and hospitals are predominantly state-financed, whilst

primary health care is split between state and centre)[146]. Whilst primary health care services have always been intended to be relatively comprehensive in scope and coverage, the reality of service delivery in India has varied according to the perceived competing demands of national priorities. Thus, for most of the 1970s and 1980s, much of the reproductive health service delivery was directed at achieving family planning targets, and not at preventing or alleviating more general reproductive or other health problems.

Whilst primary health care services have always been intended to be relatively comprehensive in scope and coverage, the reality of service delivery in India has varied according to the perceived competing demands of national priorities.

However, the government's commitment to policy change following the International Conference on Population and Development in 1994 and the 1995 Beijing Women's Conference has recently resulted in a paradigm shift away from vertical family planning services and towards the provision of comprehensive integrated reproductive health (RH) care at all levels of the health sector[147]. 'Client centred, demand driven, high quality, integrated services'[148] are the principles guiding service delivery. Public health services are free at the point of delivery, although patients usually have to pay for drugs and diagnostic services.

The shift towards provision of 'comprehensive' reproductive health care has stimulated a great deal of interest in the appropriate type of service delivery at various levels of the health service. In rural areas there are three main tiers within the public sector services: sub-centres are the first point of contact at grass roots level. Primary health centres, which act as referral units for six sub-centres, are maintained by state governments under the Basic Minimum Services Programmes. Community health centres, the next level of care, are established and maintained by the state governments. Finally, district hospitals, located usually in urban or peri-urban settings, constitute the apex health care facility in this pyramidal set-up. A description of the type of personnel and populations served by each of these facilities is shown in Table 3. In addition, Table 3 outlines the proposed essential services for the management of RTIs to be delivered at each level of care (adapted from World Bank[149]).

Table 3: Structure of Public Health Care Services in Rural Areas, and Recommended Essential RTI Services

Centre	Average population served	Staffing norms & facilities	Recommended Essential Services for RTI management
Community level	—	—	• Sexuality and gender information, education and counselling for high risk adolescents, general youth, men and women • Condom distribution
Sub-centre	4595	1 male multi-purpose worker (MPW) and 1 female MPW/ assistant nurse midwife (ANM)	• As above, plus: • Syndromic management • Referral mechanisms • Partner notification
Primary health centre	27345	1 medical officer and 14 para-medical and other staff, 4-6 beds	• As above, plus: • Routine serology for syphilis testing in antenatal women
First referral unit/District level hospital	232000	4 specialists, i.e., surgeon, medicine, gynaecologist, and paediatrician; 21 paramedical and other staff; 30 beds; 1 operating theatre; X-ray; labour room and lab facility	• As above, plus: • Laboratory diagnosis and treatment of RTIs including STIs

Source[149 150]

Under the Urban Revamping Scheme introduced in 1983, health posts were established to provide service delivery outreach, primary health care, family welfare and maternal and child health (MCH) services in urban areas. Health posts, along with municipal hospitals, medical schools and specialised hospitals, cater to the health service needs of the urban population. Health care facilities providing Indian Systems of Medicine, such as, *Ayurveda*, *Siddha*, and *Unani* are also part of the public sector health facilities.

In addition to the large-scale public sector services described above, health care is also provided to lower paid government employees through the Employees State Insurance Scheme. This is a para-statal national social security organisation which runs a full range of medical services and is financed through a mix of employee and employer contributions. The numbers of people covered are large: Delhi (population approximately 12 million) has 2.2 million people insured through this scheme.

5.2 Private sector in India

In recent years, the already prolific private sector has expanded in India. 'Private sector' is not a homogeneous term, but encompasses all those providers (formal and informal providers, and the for-profit and not-for-profit sectors) who are not directly financed by the state. In addition to the types of providers seen in many other countries, India has a widespread system of indigenous medical practitioners. As shown above, the majority of clients with symptoms of possible RTIs (including the STIs) seek care outside of the public sector services; in fact NACO estimates that only 5-10% of patients with STIs present to public sector care[16] . This is true not just for STIs, but for a wide range of curative services, and it is not only the economically wealthy who seek private medical care; the poor choose private providers for a variety of reasons as well.

Despite the size and complexity of the private sector in India, its functions, motivations, and general structure are relatively poorly understood and documented. It is recognised, however, that in allopathic medicine at least, there are integral links between the public and private sectors.

Despite the size and complexity of the private sector in India, its functions, motivations, and general structure are relatively poorly understood and documented. It is recognised, however, that in allopathic medicine at least, there are integral links between the public and private sectors. Both are often staffed by the same practitioners – a survey of 258 physicians in New Delhi found that among those employed in the public sector, 81% also worked in private practice[151] . Patients attending public sector services may find themselves referred to the private sector for diagnostic services, 'second opinions', or services not offered by providers in their public sector guise (termination of pregnancy is one example of such a practice).

The private sector is currently largely unregulated, and not subject to safeguards which exist within the public sector (assuring access to services, for example). Most of the services are curative: the private sector is rarely involved in prevention of illness, but one recent exception has been the growth in the 'social' marketing of condoms. Moves are underway to try and implement some degree of control and ensure standardisation of service delivery, but as in many countries, the exact mechanisms for achieving this are not clear, and there is little evidence concerning the effectiveness of any proposed mechanisms. One of the difficulties in achieving regulation within the private sector is the relative stakeholder strength. The allopathic private sector has grown considerably in the recent past, and the ability of the state to exert control over this sector is increasingly questioned. One possible procedure for increased state regulation which is now being discussed is to develop public-private collaboration through, for example, the government subcontracting services from the private sector. However, the ability of the state to be both partner and regulator of the private sector is a dialectic which is still in evolution.

5.3 The NGO sector

As is the case with many countries, the not-for-profit NGO sector in India plays an influential and important role in many of the social sectors. In health care, there is a predominance of NGO activity in the delivery of interventions in the field of reproductive health in general, and HIV/AIDS in particular. The programmes initiated by NGOs tend to have a greater degree of flexibility and more opportunities for innovation than can be provided in the public sector. The NGO scene ranges from small grass-roots organisations working in defined locales to large-scale institutions with multiple sites and target populations. This is further explored in Section 6.4.

6. STD Prevention and HIV Control Programmes in India

A National STD Control Programme was initiated in 1946 (prior to the establishment of independent India) which was in operation until 1991. The programme focused on the health seeking behaviour of individuals with STDs and on combating social stigma associated with these infections. With the emergence of the HIV epidemic, the National STD Control Programme was made an integral part of the National AIDS Control Programme in 1992. The major objectives of the current STD Control Programme are to reduce STD cases and thereby control HIV transmission and to prevent short term and long term morbidity and mortality due to STDs. The major strategies for achieving these objectives include[16]:

- development of adequate and effective programme management;
- promotion of information, education, and communication (IEC) activities for the prevention and transmission of STD and HIV infection (including condom promotion);
- comprehensive case management including diagnosis treatment, individual counselling, partner notification, and screening for other diseases;
- increasing access to health care; and
- early diagnosis and treatment through case-finding and screening.

6.1 Surveillance activities

HIV surveillance began in 1985 with screening of blood from 'high risk groups' in two cities. With the objective of identifying the geographical spread of HIV infection and the major transmission modes, surveillance activities were extended in 1986 by establishing 62 surveillance

centres. Sentinel surveillance was introduced in 1993 in 55 sentinel sites to monitor trends in different parts of the population. An additional 125 sentinel sites were established during 1997-98. AIDS case surveillance is an important component of the surveillance activities and all medical institutions are required to report suspected AIDS cases, and referral institutions report all identified patients, to the National AIDS Control Organisation.

STD surveillance through syndrome-based information from peripheral health institutions under the primary health care system and aetiological information from STD clinics is due to be introduced, but neither this nor other forms of STI surveillance have yet started.

The first wave of behavioural surveillance surveys (BSS) in India was launched in Tamil Nadu in 1996 and was followed up with successive surveys to observe trends in high-risk behaviour among selected subpopulation groups such as female sex workers, truck drivers and helpers, male and female factory workers, and students.

Behavioural surveillance has recently been incorporated into HIV surveillance activities and baseline surveys are currently underway in a number of settings. The first wave of behavioural surveillance surveys (BSS) in India was launched in Tamil Nadu in 1996 and was followed up with successive surveys to observe trends in high-risk behaviour among selected subpopulation groups such as female sex workers, truck drivers and helpers, male and female factory workers, and students. Thus far, four survey rounds have been conducted. In each wave, data have been collected on a number of knowledge and behavioural indicators: knowledge of HIV transmission modes and of STD/HIV/AIDS prevention measures; sexual behaviour with non-regular partners; condom use during last sexual encounter with a non-regular partner; prevalence of self-reported vaginal/urethral discharge; STD treatment seeking behaviour; and perception of risk of HIV/AIDS[152]. Findings from the first three rounds of BSS in Tamil Nadu suggest that knowledge of methods of prevention of STI/HIV has increased among all targeted sub-populations; misconceptions about HIV transmission have reduced for all groups except female sex workers; sexual intercourse with non-regular partners decreased among two of the population groups (trucking staff and male factory workers) and it continues to remain low in female factory workers;

condom use with non-regular sex partners has gradually increased for all the groups; self-perceived risk of contracting HIV has increased for population groups engaging in 'high-risk sexual behaviour'; and treatment seeking behaviour for symptoms of urethral discharge decreased somewhat in the third round[153].

Behavioural surveillance surveys on similar lines have been launched in other states: West Bengal (2 rounds), Andhra Pradesh, Gujarat, Kerala, and Orissa (1 round each). The sub-populations targeted for surveillance activities vary among states, but female sex workers and their clients are common surveillance targets. In addition, a nationwide behavioural surveillance survey of trucking staff has been undertaken (Dr. Thomas Philip, Family Health International, personal communication).

6.2 STD case management

The main strategy aimed at achieving the objectives outlined above has been to integrate STD services into the existing health care system (public and private), with a special emphasis on integration at the primary health care (PHC) level. As in many countries, this has resulted in the development of case management guidelines and a large scale training programme for health workers. There are 504 specialised public sector STD clinics in the country (usually attached to district or other level hospitals), and these have also been strengthened as part of the overall national STD strategy. Further, the five regional teaching and training centres, which also house the microbiology referral laboratories, have been upgraded.

6.2.i The effectiveness of care (including costs)

Syndromic management is recommended by the National AIDS Control Organisation (NACO) for case management at the primary health care level[16]. The effectiveness of syndromic management in women is currently under debate, but it is recognised that effectiveness (including costs per infected person treated) is related to prevalence[154 155]. As outlined in the introduction, the prevalence of RTIs (including STIs) varies widely within the country, so reviews of the effectiveness of particular management strategies cannot be extrapolated. Recent reviews of the effectiveness of syndromic management found only one such study from India[156 157]. This was carried out in New Delhi among over 300 symptomatic women seeking care in an NGO reproductive health clinic[59]. The STI prevalence in this clinic population was reasonably high with 22% of women having an STI (chlamydia, trichomonas or syphilis; none with gonorrhoea) diagnosed in the laboratory, including 12% with *Chlamydia trachomatis*. As with other studies, the recommended syndromic

flow charts performed well for the management of vaginal infections, but the STIs were poorly managed with only 5% of women infected with chlamydia receiving appropriate treatment. Reviews of the effectiveness of care for men could not be located.

The NACO 1998 Country Scenario states that "syndromic management has been favoured in the management of STD cases because of its cost effectiveness", however, we were unable to locate any Indian STI cost-effectiveness data preceding the publication of this document. The global review of the costs of syndromic management[158], referred to above, calculated (using published Indian market drug prices) that in the Delhi-based evaluation of syndromic management, the per woman drug costs of treating symptomatic women using recommended guidelines were US$0.61 per woman (rising to US$0.78 if the costs of staff time were included as well)[157]. Calculation of the cost of treating women who were actually infected with either gonorrhoea or chlamydia revealed a calculated drug cost of US$97.65 per infected woman. For comparison, the per capita health expenditure by the Indian government currently stands at $1 per annum[141].

6.2.ii The quality of care

Long ignored as an issue within reproductive health care in India, there is a current programme shift towards incorporating objectives of quality of care within the public sector services. This represents a significant step forwards for the health care system. However, moving beyond rhetoric to actually implementing change has not yet been noticeably achieved in many parts of the country[159]. Whilst there are some detailed case studies available on the quality of services within the broad family planning system (see Koenig and Khan[159]), there are remarkably few studies addressing this issue for STI clients.

The few studies which do exist have found that the quality of STD case management, especially STD counselling for prevention, in STD clinics is inadequate and poor[160 161 162]. Observations of STD consultations in Chennai revealed that advice of condom use for prevention of STDs was given during only 30% of the consultations; instructions on how to use condoms were imparted to 6% of the clients; and condoms were provided to 1%[160].

In the rural study in Tamil Nadu, referred to earlier[36], it was observed that only 15% of the symptomatic women who had sought treatment from a health care facility were informed by the providers about the cause of their symptoms or the precautions to be taken to avoid the illness. Slightly more than one-quarter (28.3%) of the symptomatic men who sought treatment from a

heath care facility were advised by their doctors about the cause of their symptoms and the precautions which needed to be taken.

6.2.iii Partner notification

Partner notification is seen as a cornerstone of effective STI management, but studies in India have shown that this procedure is rarely discussed or initiated by health care providers. For instance, a clinic based study in Chennai[160], observed that advice on partner notification was given during only 27% of the consultations. Similarly, a clinic based study in Delhi reported that none of the 100 male and female STD patients were advised about partner notification[161]. In a community-based study in rural Tamil Nadu, it was reported that none of the symptomatic (suggestive of RTIs) women and only 5.7% of the symptomatic men were advised to have their spouses examined for a possible infection[36].

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Along with problems on the part of providers in the field of partner notification, there is an added difficulty with some male STD patients falsely identifying themselves as unmarried or giving untraceable addresses[138]. Jeyasingh and colleagues[163] observed that levels of awareness among male STD patients about the need for partner referral and sexual abstinence were very poor.

6.3 Other public health measures for STI control

Aside from strengthening case management, the other pillars of public health interventions for STI control are implemented more patchily throughout the country. There has been a public sector syphilis screening programme for pregnant women since the 1950s. However, this is applied unsystematically, and is further compromised by the fact that nationally only 57% of women receive antenatal care in the public sector[12]. Even women seeking antenatal care are likely to only receive a limited range of services – less than half have their blood pressure checked, for example[12]. The opportunities for other interventions are also limited – in rural India, only 33.6% of births

are attended by a health professional[13] (doctor, nurse/midwife, or other health professional) and less than a quarter of births are in institutional settings, thus reducing the impact of ophthalmia neonatorum prevention programmes for example.

Cervical cancer screening is another example of a programme that is only in its infancy in India. Annually, approximately 90,000 women develop cervical cancer in India, but the absence of a screening programme means that many of these women do not present for care until the cancer is at an advanced stage (communication from Institute of Cytology and Preventive Oncology, Indian Council for Medical Research). Establishing a screening programme is problematic in a setting where those women most at risk (i.e. older women) are unlikely to attend public sector health care settings (which are predominantly for maternal and child health care), and the concept of screening is not documented.

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6.4 STI prevention and care outside the public sector

Perhaps as a result of a stimulating and innovative NGO climate, the country has some of the most well known and potentially most successful interventions to slow the spread of STIs, including HIV, in groups at higher risk of infection. The types of interventions undertaken range from promotion of IEC material, through provision of health services (including STI services), to home-based care for people with HIV/AIDS. Possibly the best known is an intervention among sex workers in Kolkata. Known as 'Sonagachi' (after the district in the city where many of the brothels are located), this intervention has become globally recognised for the innovative approach it has taken to risk reduction. Recognising that sexual behaviour is not determined by individual-led parameters alone, the intervention has sought to address a wide range of social, economic, health and other concerns of the women working in the brothels. Activities such as non-formal education, children's immunisation, cultural programmes, promotion of self-employment and vocational training, legal training, and activities targeted at clients have all been supported in Sonagachi. The project is now run largely from within the brothel community, and has succeeded in a number of areas – increased literacy being one of the major achievements. HIV rates in women selling sex in the Sonagachi area have remained relatively stable, and are currently at

around 5%. Rates of other STIs have fallen during the lifetime of the project[164]. These figures compare, for example, with data from Mumbai which found an increase in HIV prevalence in female commercial sex workers from 21.1% to 51% over the period 1990 to 1994[165].

Other targeted interventions carried out with the assistance of NGOs have concentrated on injecting drug users and people working along highways (truck drivers and their assistants, for example). Injecting drug use has been a significant problem in India's north-east states (bordering Myanmar), and HIV rates among IDU there are currently over 80%. Once thought to be a relatively contained problem, injecting drug use (especially of buprenorphine) is currently thought to be on the increase throughout the country (Dr. S. Panda, personal communication).

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The public sector, through NACO, is committed to partnerships with NGOs, in a variety of ways to interrupt HIV/STI transmission among groups at higher risk[141]. Such partnerships are not limited to intervention activities, but also encompass baseline research to inform programme design. One successful model of government/NGO collaboration in HIV/STI control is found in the southern Indian State of Tamil Nadu where the State AIDS Cell (a government body) was converted into a Registered Society with its own executive committee which includes NGO representatives. The Society monitors the activities of the public sector in HIV control, and also directly funds NGOs to work with both 'risk groups' and the 'general population'. This public sector/NGO cooperation has served as a model to promote similar partnerships in other states in India[166].

6.5 Voluntary HIV counselling and testing

The Government of India policy statement on HIV testing emphasises that no individual should undergo mandatory testing for HIV, adequate voluntary testing facilities with pre- and post-test counselling should be made available throughout the country, and there should be at least one government-run HIV testing centre per district[167]. To implement these objectives, the public

sector has been collaborating with NGOs that have taken the lead in developing anonymous HIV counselling and testing centres. A model HIV counselling centre, the first of its kind in the country, has been established in a large government hospital in Delhi. This centre is jointly run by NACO, the hospital itself, UNAIDS, and a consortium of six Delhi-based NGOs which provide counselling services. The centre has facilitated the provision of a continuum of care for HIV positive persons through its linkages with other NGOs, community-based organisations, and service providers in the community.[168] It is reported that this collaborative effort has had an impact on policies and practices throughout the hospital regarding the appropriate use of HIV testing, the protection of the confidentiality of HIV test results, and the right of people living with HIV/AIDS to medical services[169]. The government is planning to make it mandatory to have counselling services, run by an NGO and trained and funded by the State AIDS Cell, in all HIV testing facilities in government medical colleges.

6.6 Care for people living with HIV/AIDS

Isolation, stigmatisation, and other forms of discrimination characterise the experience of the vast majority of people living with HIV/AIDS in India and pose severe constraints on their ability to reveal their HIV/AIDS status and avail health care and support. There have been instances where HIV/AIDS patients have been refused admission to hospitals, both government and private.[170] Indeed, although various measures have been taken by the government, private, and the NGO sectors to provide high quality care and support to people living with HIV/AIDS, studies show that hospitals and other care settings are the main sites where HIV positive people experience discrimination and stigmatisation.[171]

Compounding these disadvantages is the exorbitant cost of most treatment options. For example, although antiretroviral drugs are currently produced by Indian pharmaceutical companies and sold at prices well below those in industrialised countries, only 3-5% of the known HIV infected individuals are currently able to afford such therapy in India[172]. As a result of widespread influences and beliefs including the perceived incurable nature of HIV infection, advertisements in media promoting dubious cures for HIV/AIDS, myths about side effects of allopathic medicines, and an inability to afford the cost of antiretroviral treatment, the use of 'alternative' medicines is very common among HIV infected people [172].

As the absolute number of people living with HIV/AIDS increases, provision of health care and social support has become a more pressing issue, and has been adopted as an integral

component of the National AIDS Prevention and Control Policy. The measures taken by the government to meet the growing needs for care and support of people living with HIV/AIDS include: provision of free drugs for the management of opportunistic infections in patients at government health care settings; counselling services for HIV infected people; and supporting NGOs and community based organisations in providing hospice care. NACO, in collaboration with the World Health Organization (WHO) and local NGOs, has been conducting pilot programmes on care and support for people living with HIV/AIDS in Manipur, Maharashtra, and Tamil Nadu. Just as in the context of voluntary counselling and testing, the NGO sector has established model care and support programmes for people living with HIV/AIDS in many of the larger cities. Similarly, HIV positive people's support movements such as the Indian Network of Positive People (INP+), though still in their infancy, are undertaking the task of mobilising support. Currently absent from the government programme and the NGO programmes are any subsidies towards the purchase of antiretroviral drugs.

7. Expenditure in Health Programmes

7.1 Expenditure in one state

A recent survey of household level expenditures on reproductive and child health (RCH) care in Rajasthan provides a comprehensive look at spending patterns in this field[173]. Whilst the data can never be said to mirror exactly the expenditure patterns in all other states, it may reflect the general trend of where money for health care comes from, and how it is spent. The Rajasthan data (gathered from a random survey of 1100 households in and around the city of Udaipur) show that household expenditure is the largest source of financing in RCH. The State of Rajasthan spends a total of 6% of its GDP on health care, of which just over 21% is spent on RCH services. Nonetheless, by far the largest source of financing for health care in Rajasthan comes from household (out-of-pocket) expenditure – 71% of the total spent on health, and 80% of expenditure in the RCH sector. Money spent on what is termed 'RTI services', constitutes the third leading use of public sector (government and donor) funds in RCH (after maternity and child health services). At the household level, it constitutes the top expenditure used to purchase all types of RCH care. In other words, families surveyed in Rajasthan spent more of their own money on seeking care for symptoms of RTIs than they spent on child health care, and all forms of safe motherhood (pre- and post-natal, obstetric, and abortion services).

In the Rajasthan survey, over one-third of women reported an RTI-related symptom in the last three months (abnormal discharge, pain on urination, abdominal pain during sex, or post-coital bleeding). Such a result is similar to that found in other population-based studies [124] – as referred to above. The caveat to this is that when infective causes have been looked for as the aetiology of these symptoms, they have often not been found. As discussed above, there is a poor correlation between reported morbidity and the presence of laboratory-confirmed infection. Such findings make the reported household-level expenditures on *symptoms* of RTIs even more disturbing.

7.2 Expenditure and allocation for nationwide STI control programmes

The programmes for prevention and control of STDs are currently an integral part of the overall AIDS control programme. Table 4 shows the allocation of funds for the various components of the AIDS control programme for the period 1992-99. Funding for the HIV/AIDS programme comes from a variety of sources, including Central Government – which has committed $200 million to NACO over the period 1997-2002. In 1999, the World Bank approved a credit of $191 million dollars for a five-year HIV/AIDS control programme of activities (with an extra government contribution of $38 million, and contributions from other external partners of $99 million[141]). This large project will prioritise interventions among groups perceived to be at higher risk of infection, but will ensure programme activities for others as well. Donors (bilateral and multilateral) invest heavily in HIV/AIDS and STI control in the country, and there is a strong technical input into the sector from both UN agencies and bilateral donors.

Table 4: Financial Allocation for Components of AIDS Control Programme and Actual Expenditure during the 1990s

Year	Programme management	Blood safety	I.E.C	Surveillance & clinical management	STI control	Total budget estimates	Actual expenditure
1992-93	1.40	4.80	5.65	2.43	1.99	16.28	6.91
1993-94	0.71	5.25	7.59	1.85	1.56	16.98	7.61
1994-95	0.68	8.17	7.77	1.75	0.82	19.20	10.23
1995-96	0.94	6.61	8.29	1.94	0.82	18.60	12.42
1996-97	2.66	8.99	17.58	1.99	1.57	32.79	26.61
1997-98	1.65	13.82	6.02	0.38	1.39	23.25	28.61
1998-99	1.59	10.49	6.55	4.03	3.15	25.81	25.12

Source[16]

Note: US $ in millions at the exchange rate of 1 US $ = 43 Rupees

During the 1990s the major expenditures of the HIV/AIDS control programme were in promoting IEC activities and in ensuring blood safety. The prevention and control of STIs received only a small share of the total allocation for HIV/AIDS control. Financial allocation for STI control declined from 12% of the total financial outlay for HIV/AIDS control in the year 1992-93 to 4-6% during the year 1994-98. However, the year 1998-99 witnessed an increased financial allocation, perhaps, a reflection of the increased acknowledgement by policy makers of crucial links between STIs and HIV.

At present, clinical management of people with HIV/AIDS and surveillance for these infections together receive less than one-sixth of the AIDS control programme budget, however this is a substantial rise on the immediately preceding years' expenditures. This figure may be expected to rise in the future; not only will the number of people requiring clinical care increase, but the local cost of anti-AIDS drugs is also expected to rise. The recent World Trade Organisation/ Trade Related Intellectual Property Rights (WTO/TRIPS) agreement may have the potential to compromise the ability of local Indian companies to produce cheaper versions of effective drugs. For example, the current local cost of locally produced fluconazole in India is $55 for 100 tablets, compared to $697 in Malaysia and $817 in the Philippines[170].

It is worthwhile noting that the utilisation of funds allocated for HIV/AIDS control has been sub-optimal until very recently. For example, only around fifty % of the total allocation for HIV/AIDS control was utilised during 1992-95.

8. Conclusion

India, united through many aspects, displays remarkable diversity – perhaps at a level to be expected given the size and scale of the country and its population. Such diversity is apparent from even a cursory review of the known epidemiology of STIs in India. With published rates ranging from 0.5% to 28.7% of women in community-based studies infected with chlamydia, it is hard to overestimate the scale of the challenge faced by policy makers and programme managers charged with designing effective, accessible, and affordable programmes for STI control in the country. There is no 'Indian scenario' of sexually transmitted infections, including HIV, *per se*. In its place there is a complex interplay and overlap of different STI/HIV epidemics at different stages of development, with varied underlying causes, which need to be addressed by different system-level interventions. Nonetheless, there are common challenges throughout India for the design of appropriate responses to the problem of STI control in the country. These are not only the common themes of poverty, illiteracy, and gender-based disparities, but some features which are specific to the STI situation in India. These can be summarised as follows:

Epidemiological evidence

1. Lack of epidemiological data. There is currently no functioning surveillance system (active or passive, using primary or secondary data sources, and no data collection from the majority of providers – the private sector) for STIs in India. Programme managers at both state and local levels often have no idea of the exact burden of STI-related disease in the communities they are serving. Extrapolating results from one part of the country to another is fraught with difficulties. Similarly, there are no data available to show trends of STI data with time. These problems are exacerbated in the case of men where even less is known about the burden of STI-related disease.

2. Current data sets are flawed by a lack of standardisation. Even when data exist on the STI situation in a particular geographical area, comparisons with results from other studies are

difficult given the highly divergent nature of the study and laboratory methods. The challenge for both researchers and surveillance managers is to ensure a standardisation of methods in the future.

Evidence for risk and protective behaviour

3. Poor knowledge of sexual networks. Sexual behaviour research is very much in its infancy in India. There is scant understanding of both the quantitative and qualitative nature of sexual behaviour in the country. The concept of sexual network research has not yet been put into practice, although it has been discussed on some research agendas.

4. Understanding health care seeking. Whilst we know something about patterns of health care seeking, the underlying motivations (and, hence, opportunities to intervene) are less well understood. The role of a wide variety of possible influences (monetary, geographical, gender-based personal relations, perceptions on the quality of care, etc) have yet to be appreciated in relation to people choosing health care providers for STI/RTI symptoms.

Effectiveness of care

5. Appropriate health-care interventions not yet defined. In the public sector, much attention has been focused on the promotion of case management strategies for symptomatic people with possible STIs. There has been remarkably little research on the effectiveness of this strategy – clinical effectiveness, cost-effectiveness, operational effectiveness. Such research is vital in a country where the prevalence of the infections being targeted is not well understood, there is a large cultural overlay to reported symptoms, and the ability of the primary health care system to integrate STI management has not been assessed. Further, there has been a tendency to concentrate on aspects of case management and overlook other strategies in STI control (such as antenatal syphilis screening, or screening for cervical cancer). In many cases, these other aspects of STI control have been shown to be highly cost-effective strategies, but have failed to gain a high place on the public health agenda. Thus, for example, the case of materno-fetal transmission: India has had a policy for antenatal syphilis screening since the 1950s, but this has never been operationalised nationally. This can be contrasted, for example, with the current efforts to prevent materno-fetal transmission of HIV.

Structure of the health service

6. Role of the private sector. Studies throughout India show that the most common sites for seeking health care are outside the public sector. This is true not just for STIs, but for a wide

variety of reproductive health conditions. Yet, the large and influential private sector remains almost undocumented and virtually unregulated. As a consequence, there is currently little hope of enforcing standards of care (including laboratory support) in the multi-faceted private sector.

7. *The reproductive health challenge.* Despite all of the above caveats, there is a general consensus that STIs are currently higher on the policy and research agenda than at any time in the recent past. In part this may be due to the impetus provided by the HIV epidemic, but it is also fuelled by the very public government commitment to abandon long-held family planning targets and develop a comprehensive reproductive health care programme which includes integrated STI/RTI care. Moving beyond the rhetoric, which has now been clearly articulated and agreed upon, presents an even larger challenge to the health service: which populations should be reached, with which services, and, fundamentally, how much will this cost? The challenge now is to answer these and many other questions in India in a way that pre-empts the development of an even greater threat fuelled by the fear of an HIV epidemic, but also retains relevance to locally defined situations.

8. Resource allocation. We have seen that although funds may be committed to STI control, they have not always been used. Further, there is little published documentation in current use to assist policy makers and programme managers in making rational choices concerning the appropriate resource allocation given their current epidemiological, cultural and economic situation.

A vulnerable population

9. A poorly educated population. India faces enormous challenges in dealing with the high levels of illiteracy in the country. This carries with it specific challenges for IEC primary prevention campaigns, but innovative approaches to mass communication have been adopted with success on other issues, including reproductive health issues.

10. Structural inequalities. The United Nations International Conference on Population and Development held in 1994 articulated the fundamental link between structural/macro-factors and reproductive health goals. As we have seen throughout this paper, vast numbers of people in India are severely disadvantaged in terms of income, education, power structures, and gender. Addressing these basic issues of human rights lies at the core of achieving better health outcomes (including reproductive and infectious diseases) in India. Such a challenge is formidable both in terms of required scope and coverage, but lies at the heart of improving health for the greatest number of people in India.

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